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NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Immersion Foot: Vascular and Neurological Lesions of the Extremities in Survivors of Shipwreck. Recently published observations of crews from torpedoed vessels have shown that they may develop incapacitating swelling and pain in their legs and feet. In contrast to actual frost-bite, which occurs only after exposure to air at temperatures well below freezing, "immersion foot" develops when the feet are wet for a period of several hours or more in cold water. The severity of the process depends on the period of immersion, the degree of cold, and the protection afforded by wearing apparel or by greasing the skin.

The investigations of Lewis (Brit. Med. J., '41:2:795) have shown that swelling caused by increase in capillary permeability begins at around 50° Fahrenheit. Edema develops more rapidly as the water temperature approaches freezing, but actual formation of ice-crystals will not occur in living tissues at temperatures above the freezing point of salt water. For this reason massive gangrene has not been seen in the absence of infection. On rescue the feet are discolored, blistered, edematous, and insensitive. When warmed, they become even more swollen, feverishly hot, and very painful. This is due to a sterile inflammatory process.

Pathological changes have been shown by Ungley and Blackwood (Lancet, '42:2:447) to consist of thrombosis in the subcutaneous vascular network and injury to the nerve. The deeper tissues, which are less injured by cold, are the site of a reactive hyperemia.

After a period of seven to fourteen days the inflammatory reaction subsides, but pain may persist for several months until the injured nerves have fully regenerated. Barring infection from the rupture of blisters and entrance of virulent streptococci (as often occurs in the related syndrome of "trench foot") the prognosis is excellent.

The role of the Medical Officer is twofold: prophylactically, to lessen the degree of thermal injury and prevent infection, and therapeutically when the lesion is established, to promote healing and relieve pain by reduction

of cutaneous anoxia. Naval personnel, who may be exposed after shipwreck, should be taught that feet can be protected against cold and wet by avoiding tight shoes, greasing the skin, and wrapping the feet loosely in odd bits of cloth. Elevation of the legs and exercising the toes is also helpful. However, under conditions of extreme sub-zero weather, where freezing of the feet would seem inevitable, the formation of ice-crystals and massive gangrene can actually be avoided by accepting the lesser evils of prolonged immersion.

When survivors are rescued with chilled, anesthetic, swollen and blistered feet, they should be carried aboard and their skin protected against rupture of the blisters and pressure necrosis. Never rub these feet nor paint them with strong disinfectants. While the patient is being warmed, it is vitally important to keep his injured feet cool. This is best accomplished by exposing the legs below the knees to a cool room temperature and directing a blast of air from an electric fan or blower over them.

The blisters should be handled like a second-degree burn with aseptic precautions, sulfonamide therapy, and a "booster" dose of tetanus toxoid. Elevating and cooling the legs will help drain the edema fluid and cause the blisters to shrink.

During the period of sterile inflammation the hyperemia of the deeper tissues, which are always less damaged than the skin by cold, will cause the surface temperature to rise to above 90°. Unless this excessive temperature is reduced, cyanosis will increase, blisters swell, and pain become acute. The explanation of this is that warming increases the metabolic demand for oxygen on the part of the cutaneous cells to a greater extent than can be met by the supply of blood through the injured subcutaneous vessels (White: New Eng. J. Med. Feb. 18-43). Anoxia therefore ensues with severe pain, increased extravasation of fluid, and necrosis of the skin.

The greatest advance in treatment of immersion foot during this hyperemic stage has been the application of continuous cooling by Webster, Woolhouse, and Johnston (J. Bone & Joint Surg. '42:24:785). The ideal cutaneous temperature level is between 80° and 75°. It lowers the metabolic need for oxygen to a point at which it can be supplied through the injured capillary bed. Similar suggestions have been made recently for the treatment of severe burns (Elman et al; Proc. Soc. Exper. Biol. Med. '42:51:350) and shock (Blalock and Mason: Arch. Surg. '41:42:1054).

When the feet are cooled cyanosis recedes, blisters shrink, and pain is relieved. The feet are surrounded by a dry bath towel and two to four ice bags, which are insulated from the surrounding air by a layer of cotton waste and a rubber sheet. Do not let the skin get wet. Maceration is harmful. Do not let it become too chilled, i.e., below 70°.

As the hyperemia subsides, the ice bags can be reduced in number and finally substituted by exposure to room air and a fan. After ten days or two weeks the normal circulation is re-established, blisters and swelling subside, and the skin desquamates with little or no necrosis. Patients should then be given a period of orthopedic foot exercises and allowed to get up.

After the above outlined treatment, all but the most severe cases can return to duty in less than a month. In the most severe group, pain due to nerve injury and tissue fibrosis may prove incapacitating for several months. These patients can be helped by diathermy and physiotherapy. Sympathectomy has been advocated, but the best opinion is that it can only help in the late stages, complicated by residual trophic changes and abnormal vasoconstriction of the peripheral arterioles. (J.C.W.)

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Warm Seas "Immersion Foot" a Different Condition: Sailors adrift in warm seas for prolonged periods (several weeks or more) in overcrowded lifeboats, and depleted by starvation and dehydration, are also prone to develop incapacitating pain and swelling in their feet, but the physiological and pathological causes seem to be quite different. Here the important factors are hypostatic congestion with varying degrees of tissue anoxia, hypoproteinemia, and probably also a deficiency in the vitamin B complex. (White: U.S. Nav. Med. Bull., Jan. '43.)

These survivors may show no evidence of thermal injury, yet have even more extensive edema reaching to the knees, and profound neuritic changes in the feet. Ataxia and aching pain are present in the legs, and lesser sensations of tingling in the hands. Ulcerative stomatitis, glossitis, and bleeding from the gastro-intestinal tract have been observed in many of these men. In addition to the laboratory evidence of dehydration and fall in serum protein below the critical edema level, some of these subjects have shown an increased prothrombin time.

While it is not yet proved that this syndrome represents a deficiency in vitamin B as well as hypostatic and starvation edema, these patients have responded rapidly to a high protein, vitamin rich diet. This syndrome should also be considered as a complicating factor in immersion foot and trench foot, whenever the picture is complicated by prolonged malnutrition. (J.C.W.)

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Appendectomies by Hospital Corpsmen: The public press has, in the past few months, announced three appendectomies by hospital corpsmen. All of these were apparently successfully performed by Pharmacist Mates, first class, who had had hospital operating room experience.

Since war conditions may create situations in which corpsmen should have discretion, orders discouraging such surgery by hospital corpsmen cannot be issued. However, it is the rare man not trained in surgery whose chances of proper diagnosis and successful operation are at all good.

Dangers of such surgical work may well be weighed against the dangers of expectant, palliative, non-operative treatment of acute appendicitis.

Notoriety, commendation and public acclaim should not encourage hospital corpsmen in rash surgical adventures.

Suggested Treatment for Jellyfish Stings: Stuart and Slagle report two cases of stings by "Portuguese man-of-war" in which prompt relief of the major symptoms followed the intravenous injection of a solution of calcium gluconate. (U.S.N. Med. Bull. March '43.)

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Camouflage of Wound Dressings is Necessary: White bandages as well as the red and white arm brassards of hospital corpsmen have proven to be good targets for enemy snipers.

It is planned that cover or outside bandages may in the future be furnished in some neutral color.

For the present, a practical suggestion is that after field application of a dressing, the outside be rubbed by hands soiled with dirt, sand or dust. Contamination of wounds covered by the bandaged dressing can, and should be guarded against while resorting to this simple means of camouflage.

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Malaria Control, Importance of Screening and Indoor Spraying: The necessity of screening is generally recognized, but the importance of spraying with insecticides to kill trapped mosquitoes is not always appreciated. To emphasize the importance of the latter, the following items from notes taken at a recent meeting of the New Jersey Mosquito Extermination Association are submitted:

Colonel L.L. Williams, Jr., U.S.P.H.S. said that complete screening of houses and regular indoor spraying are the most efficient methods of keeping down the incidence of malaria.

Lieut. Colonel B.F. Russell, M.C., U.S.A., describing his ten years' experience with malaria control in native rural populations in India and the Philippines, stated that screening and indoor spraying are the best and most effective methods. It is, in addition, the only economical one. It can be done at a cost of ten cents a year per person.

Dr. L.T. Coggeshall, of the University of Michigan School of Public Health, discussing malaria control along the U.S. Air Transport Route through Africa, stated that in one field there was not one case of malaria among the 60 Americans who used thorough screening and spraying, while there were 87 cases of malaria among the 90 Britishers who used only bed nets and atabrine.

In this connection, attention is invited to the new Pyrethrum-Freon-Insecticide Spray available through supply officers and Marine Corps quartermasters. Some advantages of this insecticide were enumerated in a Form Letter from the Chief of the Bureau of Medicine and Surgery, dated January 21, 1942, and are repeated below:

"(a) It requires three gallons of the ordinary standard spray to equal one pound of aerosol solution (Pyrethrum-Freon-Insecticide).

(b) It occupies only about one-fourth the stowage space.
(c) It is noninflammable; in fact it is a fire extinguisher.
(d) It requires little or no equipment to operate.
(e) All ingredients are nontoxic.
(f) It remains suspended 10 to 20 times longer than sprays.
(g) One pound will treat 150,000 cubic feet more efficiently than one gallon of spray will treat 50,000 cubic feet.
(h) There is much greater penetration into protected places." (E.G.H.)

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Normal Responses to Exercises which Might be Confused with Pathological Changes: This subject was recently investigated by Johnson at the Harvard Fatigue Laboratory. The results indicate that albuminuria, hematuria, pyuria, cylindruria, ketonuria, leukocytosis and fever up to 104° F. may occur after moderate exercise, such as marching, in perfectly healthy men. Albuminuria may vary from plus 1 to 4. The urinary sediment may show many white cells, red cells, and casts. Ketonuria (diacetic acid and acetone) may vary from 1 to 4 plus. The leukocyte count may rise to 13,000 in soldiers marching in hot weather; a rise to 27,000 in football players and to 17,000 in wrestlers after intercollegiate games has been observed. A rise in rectal temperature regularly accompanies muscular work; in fact, most men are not efficient or "warmed up" until the rectal temperature during work is between 100-102° F. This is true even in Arctic weather. In hot weather, the temperature elevation may reach 104° F. These normal responses to exercise subside in a few hours of rest and administration of water; the ketonuria often only after ingestion of carbohydrate food. Obviously these responses must be considered in the differential diagnosis of many conditions occurring in personnel subjected to strenuous work. (N.R.C. - Subcom. on Clin. Inves. - Report #14 - R.E.J. 1/27/43.)

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Shock - It is too late for prevention when shock can be recognized: Shock treatment should be started early for seriously wounded patients even in the absence of "prodromal" signs. It is wiser to "block shock" if the injury is severe and if there is evidence of much blood-soaked clothing, bleeding of long duration, burns of large surface, extensive crushed areas, severe dehydration, history of blast injury, exposure to cold, or immersion. Other casualties should be examined at frequent intervals, as time permits, in order to watch for the "prodromal" signs. As the sorting process continues treatment should be started as indicated and before "typical clinical shock" has occurred. Bear in mind though, that intravenous injection or transfusion may dislodge a clot unless hemostasis is known to be complete. This risk usually must be accepted in cases of severe shock.

Every wounded man is in shock to a greater or lesser degree. Treatment should anticipate the "prodromal" signs which are: (1) Falling blood pressure; (2) rising pulse rate; (3) abnormal appearance; (4) thirst, restlessness, nausea and vomiting. When "prodromal" signs occur, the blood pressure has already fallen and the patient is in shock to some degree.

Hemorrhage - Use quickest method as indicated, such as tying vessel, pressure or pack, to obtain the most adequate hemostasis consistent with speed.

Tourniquet - Only to be used when direct pressure fails to check blood loss. Apply as low as possible. If limb cannot be saved do not remove tourniquet until blood or substitute is running into a vein. Otherwise loosen tourniquet, to save the extremity, at intervals not greater than one hour.

Splinting - Immediate, careful splinting of broken bones is essential as a shock preventive.

Posture - Head down for low blood pressure; exceptions - chest injuries, pulmonary edema and head injuries.

Fluids - Water, hot coffee and tea by mouth, as tolerated, except abdominal injuries and pre-operative patients.

If the desired effect on blood pressure is not obtained in 15 to 30 minutes the dose of blood or blood substitute should be repeated.

Intravenous salt and glucose are dangerous if used in the presence of head injuries, for, if the intracranial pressure is elevated above normal or is rising, it may be seriously increased by intravenous salt or glucose. In pulmonary wounds salt and glucose solutions may precipitate or aggravate pulmonary edema. Intravenous salt and glucose solutions are, however, given in large quantities in the correction of dehydration.

Burns - Plasma best for shock. Two units of plasma in first 24 hours for each 10% of burned body surface. Repeat dose during second 24 hours in average case.

Dehydration Collapse - Cool patient (don't apply cold), give water and salt by mouth. One teaspoonful (3 gms.) salt to glass of water (200 cc.). Then 1 gm. to every 500 cc. water per hour until thirst and temperature approach normal. Use veins if uncooperative or collapsed.

Heat - Conserve body heat rather than add heat by hot water bottles. Too much heat may cause sweating and fluid loss.

Exposure to Cold and Immersion - Rapid warming by external heat may precipitate shock or death. Place patient in blankets to conserve heat. (Do not warm extremities of a person suffering from immersion foot.) Give hot fluids (tea, coffee) with added sugar by mouth and then later 1000 cc. normal saline with 5% glucose by vein.

A transfusion of blood, plasma or albumin should be under way before external heat is applied.

Analgesia - Morphine (dose not to exceed one-half grain). Severe head injuries should not receive morphine.

Anesthetics - Avoid, until patient improves. Use local if possible - for major procedures ether is preferable to spinal or intravenous barbiturates.

Rapid, early treatment means saved lives and also economy of labor and materials. By treating the patient as if approaching shock, he is given the benefit of any doubt. The longer shock exists the more severe it becomes and the more difficult to relieve.

(The above discussion is a condensation of the "General Recommendations Concerning Shock" by the Subcommittee on Shock, Division of Medical Sciences, National Research Council.) (J.S.B.)

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Crab-louse Infestation: The insecticide powder now obtainable from the Medical Supply Depots (Stock No. S12-451), although developed primarily for destruction of body lice, is also effective against pubic lice. When used for this purpose, the powder should be dusted thoroughly on the pubic region and other hairy portions of the body. A second treatment should be given after a period of eight or ten days following the initial treatment. After each treatment, the patient should avoid bathing for at least twenty-four hours. The second application is necessary because the powder is not sufficiently ovicidal to destroy all the eggs ("nits").

The above treatment was recently tried on 32 cases of natural crab-louse infestation by a Research Council investigator and found to be "highly effective, safe to use, easy to apply, low in cost, and not having the objections of ointments and heavy liquids." The quantity used for each treatment averaged approximately one-half ounce.

This insecticide powder has been found equally effective against head lice. The development of this powder represents a distinct advance. Unfortunately, its formula must remain secret for the duration of the war.

Medical officers are referred to the Bureau's form letter of December 26, 1942, "Insect Repellents and Insecticide for Lice", which was mailed individually to medical officers. This letter is most important and should be on file in each medical officer's papers.

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Reports on the Use of Plasma and Albumin: The attention of all medical officers concerned with the administration of plasma or albumin is invited to the urgent necessity of filling out completely the report forms accompanying each package and returning them to the National Naval Medical Center, Bethesda, Maryland. By an analysis of such reports the demand for these blood derivatives can be estimated and necessary improvements instituted. It is particularly desirable that the reports on human serum albumin, a relatively new therapeutic agent, be completed and returned as promptly as possible.

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Safety of Pooled Plasma: Attention is called to an editorial in the J.A.M.A. for March 20, 1943, entitled "The Safety of Pooled Human Plasma." The implications of a previous editorial, September 19, 1942, on unpooled plasma entitled "Toxicity of Human Plasma" seem thus to be contradicted. The present editorial concludes as follows: "The demonstration of the surpassing value of pooled human plasma in shock has been designated 'a major medical victory'."

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Considerations Affecting Usefulness of Aerosols (Glycols) and Ultraviolet Light in Controlling Air-Borne Infections:

The glycol content of air drops about one half and remains at about that level when a room is occupied by any considerable number of persons. Reduction is due, presumably, to absorption of glycol by clothing and to the metabolizing of that which is inhaled.

While glycol does reduce the bacterial count by about one half, it is doubtful whether the infectivity of rooms while occupied is correspondingly reduced.

The bacterial count rises sharply upon the entrance of persons and with their movements, glycol or no glycol.

With rise in humidity, glycol passes into solution in which state it is not effective in less than 70% strength.

The number of bacteria and viruses per unit of spatial air is so reduced by dispersion (dilution) that the number deposited on mucous membranes is probably insufficient to cause infection.

We are assured that the skin of the fingers sterilizes the virus of influenza almost instantly even when the virus is contained in a mass of mucus. If so, virus transfer by hand is not an important mode of communication.

Bacteria and viruses are in greatest volume-density, following a cough or sneeze, within a few feet of their source and for a few seconds only. No practicable concentration of glycol could kill infective material in such mass concentration in a few seconds. That is, glycol cannot influence what is considered the principal mode of transfer (droplet).

The same general considerations apply to ultraviolet light. The sterilization of circulating top-air, even if accomplished, will not sterilize droplets. In the use of "indirect" ultraviolet, there is no incidence of rays on the area involved in droplet transfer from person to person by coughing and sneezing. Even if impracticable germicidal intensities were used by direct incidence, they could not be effective under the time-distance conditions.

Admitting the premises, which are generally accepted, neither glycols nor ultraviolet can be effective in controlling air-borne infections.

The Aerosols (Glycols) referred to above have received considerable attention in the past year or two.

That proper use of the aerosols will reduce bacterial content of air (space disinfection), is well established.

Will they prevent air-borne infections? Facts and reasoning in the above discussion bring a conclusion in the negative.

There are certain disadvantages of the aerosols; one is cost, another, inflammability. Vaporized propylene glycol may be present, due to condensation effects, in explosive concentrations.

Tri-ethylene glycol is effective in much lower concentration and probably does not condense and produce fire hazard.

This all brings us to the blunt and perhaps startling conclusion that, despite their promise, ultraviolet light and the aerosols do not replace the well known and time tried measures: (1) adequate ventilation, (2) proper space separation of persons, (3) personal cleanliness, (4) masking, and (5) disinfection of intermediates, in the prevention of air-borne infection.

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Epidemic of Influenza in 1943 - ?: In the Science News Letter of March 20, 1943, Dr. Thomas Francis, Jr. warns that a world-wide epidemic of influenza similar to that of 1918 is "a very definite possibility in 1943." Overcrowding is the hazard which Dr. Francis feels was an important factor in the production of the 1918 epidemic and which may prove an important factor in producing an epidemic of influenza in 1943. He particularly warns of the dangers of close contact and moisture-droplet infection in our crowded war production plants, buses and trains.

As opposed to this forecast there should be placed the following facts: (1) Preceding the 1918 influenza epidemic there were several months of definitely increased incidence of influenza; such increased incidence has not been noted in recent months. (2) Unparalleled overcrowding, fatigue and insanitary conditions so far have not resulted in influenza epidemics in England nor in other bombed or war-torn countries in the present war.

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Dental-Visual Education - films not now available. Announcement of films (Bumed News Letter #2) on Naval Dental subjects has proven to be, in some respects, premature. The enthusiastic demand is gratifying and at the same time embarrassing, for it cannot now be met.

It is therefore desired that no further requests for the listed films be made until invited in a later Bumed News Letter. At that time arrangements for the review of requests and assignment of priority on the basis of need and availability will have been made.

Prophylactic Immunizations - Required in the United States Navy

Since the directives for the use of the various prophylactic immunizations among Navy personnel are widely scattered, it has been deemed wise to summarize these directives and make them available for ready reference. The following charts briefly summarize the present requirements of the United States Navy for prophylactic immunizations:

Smallpox

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Cowpox virus-plain glycerinated. M.M.D. Art. 2605.	All persons in the Navy and Marine Corps upon entering the service.	Multiple pressure, (needle held parallel to skin) 15 to 20 pricks in 1/8 inch area on deltoid region of arm.	4 years.

Required repeat inoculations	Comments
All Enlisted Men: (1) upon re-enlisting; (2) upon extending enlistment; (3) upon being exposed to smallpox; (4) if doubt as to protection of previous vaccination arises. All Officers, All Members of Navy Nurses Corps and WAVES: (1) at intervals of 4 years; (2) whenever exposed to smallpox.	Reactions A. Immune reaction. Usually no vesicle. Maximum diameter of erythema reached and passed in 8 to 72 hours. Occurs in fully protected individuals. B. Accelerated Reaction. Usually a vesicle. Maximum diameter of erythema reached in 3 to 7 days. Means there has been a partial loss of the protection from previous inoculation or attack. C. Primary Reaction. Always a vesicle. Maximum diameter of erythema reached in 8 to 14 days. Observed in unprotected individuals and those previously unsuccessfully vaccinated.

Prophylactic Immunizations - Required in the United States Navy (continued)

Typhoid and Paratyphoid Fevers

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Triple vaccine containing in each cc. 1000 million typhoid organisms, 250 million each of paratyphoid "A" and "B" organisms. M.M.D. Art. 2606. Form Letter BuM&S, July 25, 1941, #P2-3/P3-1(074).	All persons in the Navy and Marine Corps as soon as practicable after entrance into service.	Standard course three injections, one week apart, subcutaneously; the first, 0.5 cc; the second, 1 cc; the third, 1 cc.	1-2 years.

Required repeat inoculations	Comments
All persons on active duty in Navy and Marine Corps to receive annually, after the standard course has been received, an intracutaneous injection of 1/10 (0.1) cc. triple (typhoid-paratyphoid A&B) vaccine as a routine booster dose.	Local and systemic reactions are common but not serious.

Prophylactic Immunizations - Required in the United States Navy (continued)

Tetanus

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Toxoid-alum precipitated. Form Letter BuM&S, P2-3/EN (054-40) March 4, 1943.	All persons in the Navy and Marine Corps on active duty as soon as practicable.	Initial immunization, two ½ cc. (0.5) injections intramuscularly with interval not less than 4 nor more than 8 weeks.	Prolonged duration. Not yet accurately determined. Present program fully protective.

Required repeat inoculations	Comments
A routine booster dose of ½ cc. (0.5) alum-precipitated tetanus toxoid intramuscularly (1) one year after initial immunization; (2) every four years after the first booster dose (in the absence of recorded emergency booster injection); (3) when practicable, one month before entering a combat zone irrespective of time interval since previous injection. An emergency booster dose: (1) upon suffering a wound or severe burn in battle; (2) upon undergoing secondary operations or open manipulations when contamination with tetanus bacilli or spores is likely; (3) upon incurring punctured or lacerated non-battle wounds, powder burns or other wounds possibly contaminated with tetanus spores or bacilli.	Tetanus toxoid injection may be given concurrently with typhoid and/or smallpox inoculations. Persons who have not received toxoid immunization and in whom passive immunization (antitoxin) may be necessary, may be started on active immunization (toxoid) by simultaneous injection in separate body area.

Prophylactic Immunizations - Required in the United States Navy (continued)

Yellow Fever

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Vaccine - a special strain of living virus attenuated through prolonged cultivation in tissue cultures. Form Letter BuM&S, P2-3/P3-1 (074) May 13, 1941.	All persons in the Navy and Marine Corps (except WAVES) as soon as practicable.	Subcutaneous injection of ½ cc. (0.5) of an approximately 1 to 10 dilution of the concentrated vaccine (freshly prepared).	Probably for 2-4 years.

Required repeat inoculations	Comments
In an endemic area a routine booster dose of ½ cc. (0.5) every 2 years. In the presence of an epidemic an emergency booster dose of ½ cc. (0.5).	Vaccine must be kept at temperature not above 4° C (39°). All diluted vaccine which remains unused after 3 hours must be discarded. Yellow fever vaccine should not be given concurrently with cowpox virus, nor to persons ill from virus diseases, i.e., influenza, etc.

Prophylactic Immunizations - Required in the United States Navy (continued)

Typhus Fever

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Vaccine - a suspension of killed typhus rickettsiae cultured by the Cox yolk sac method. Form Letter BuM&S P2-3/Ps-1(121) January 12, 1942.	(1) All Naval and Marine Corps personnel on active duty in areas where danger from epidemic typhus fever exists and (2) those about to be transferred to such areas. (Immunization to be completed when practicable at least four weeks prior to prospective date of arrival.)	Three subcutaneous injections of 1 cc. each at intervals of 7 to 10 days.	Immunity probably only relative and for not more than 6 to 8 months.

Required repeat inoculations	Comments
A routine booster dose of 1 cc. to be given subcutaneously every 6 months as long as there is danger of epidemic typhus fever.	No severe reactions have been reported. This vaccine does not protect against Murine, endemic typhus transmitted by the rat flea.

Prophylactic Immunizations - Required in the United States Navy (continued)

Cholera

Immunizing agent	Required for	Method of administration	Expected duration of immunity
Vaccine - a suspension of 8000 million killed cholera vibrio per cc. Form Letter BuM&S P2-3/FS (084-39) January 16, 1942.	All Naval and Marine Corps personnel on active duty in or traveling to areas where there is danger of endemic or epidemic cholera.	Two subcutaneous injections 7 to 10 days apart, the first to consist of ½ cc. (0.5), the second of 1.0 cc. of the vaccine.	Immunity probably only relative and for only 6 to 12 months.

Required repeat inoculations	Comments
A routine booster dose of 1 cc. to be given subcutaneously every six months as long as there is danger of infection by cholera.	No severe reactions have been reported. Immunization should be completed before entering endemic area. This vaccine may be given concurrently with typhoid vaccine.

Summary of Prophylactic Immunizations Required in the United States Navy.

1. Immunization against smallpox, tetanus, typhoid fever and paratyphoid fevers A & B required for all persons in the U.S. Navy and Marine Corps.

2. Immunization against yellow fever is required for all persons in the U.S. Navy and Marine Corps with the exception of WAVES.

3. Immunization against typhus fever is required for all persons in the U.S. Navy and Marine Corps on active duty in areas where danger from epidemic typhus fever exists.

4. Immunization against cholera is required for all persons in the U.S. Navy and Marine Corps on active duty in, or traveling to areas where there is danger of endemic or epidemic cholera. (T.J.C.)

Burns: In a forthcoming article (Nav. Med. Bull. July, '43) Strange and Mourot, reporting on cases received at various periods subsequent to their burn and early treatment, conclude that burn casualties are best treated on a special "burn" ward and by specially trained personnel. One general surgeon, one plastic surgeon, a physiotherapist and a laboratory technician are advised. These authors have treated their burn cases with a dressing of #44 mesh gauze impregnated with 6% sulfanilamide in equal quantities of cold cream and lanolin. Over this, several layers of sterile gauze are applied and compression maintained with cotton elastic bandages. Early motion of involved joints is encouraged. By clinical observation and laboratory tests they found 2% acetic acid as a wet dressing the best therapeutic agent in infected burns. They suggest the use on shipboard or in the field of large battle dressings over impregnated gauze as compression bandages. Tannic acid preparations are mentioned only to be condemned unless adequate observation for infection beneath the eschar can be maintained.

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Contaminated Wound Project: Report to Subcommittee on Surgical Infections, March 19, 1943, with 357 new summary sheets adding 133 wounds of the soft parts, 106 compound fractures and 79 burns, giving a total of 1397 cases.

It is interesting to note that there has been a relative decrease in the number of soft-part injuries and compound fractures owing to the limitations placed upon automobile traffic. Early operation (within three hours) seems definitely to minimize serious infections. Prolonged or profuse washing of the wounds is associated with a high incidence of infection, but it is recognized that other factors play an important role in this group. Wounds which are incompletely debrided show a definitely higher incidence of serious infections than those completely debrided. Partial closure seems to be worse than either complete closure or non-closure.

In compound fractures, complete closure of the wound still gives a lower incidence of infection than partial closure or no closure.

With regard to the burns, the figures are significant, indicating that serious infection is favored in those cases with a large area involved, gross contamination, maximum tissue damage and shock. Excessive washing is also associated with a high incidence of infection. Infection in the tannic acid group in general has been considerably higher than the others, and it would seem wise to discontinue this method of treatment. Secondary contamination probably plays a much more important role in burns than in other types of wounds.

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Vitamin C Important in the Repair of Injured Tissues: A person who, prior to injury or surgery, was on a diet adequate in vitamin C, requires a post-operative intake of 40 mg. of vitamin C daily for adequate healing of wounds. An intake of less than 20 mg. may produce a scar of low tensile

strength. A certain optimum amount of vitamin C is necessary for the regeneration of injured bones. Vitamin C in excess does not accelerate healing of bones in persons already getting an adequate amount of vitamin C. (Bourne, Lancet, 2:661, '42.)

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Atabrine and Alcohol: An unconfirmed report has been received from the South Pacific area suggesting that men under atabrine suppressive treatment for malaria, when they partake of liquor, become very easily intoxicated. The inference is that the two are incompatible. An informal survey of present opinion is probably advisable and timely.

No investigator, experienced in the use of atabrine, has been found who has any knowledge of the incompatibility of atabrine and alcohol. Medical officers who have had long experience with alcohol in the tropics and who, since the introduction of atabrine, have seen alcohol consumed by individuals under atabrine therapy, report no undue intoxicating effect of alcohol when so combined with atabrine.

An expert on the toxicity of atabrine believes that the story from Australia is on a par with other "old wives' tales." Further laboratory study on this point is planned.

Alcohol alone has certain toxic effects. Atabrine alone may produce certain gastro-intestinal or other reactions. Their toxic effects, whatever they may be according to concentration and conditions of ingestion, most certainly are still present. The above statement that atabrine and alcohol do not appear to be incompatible should be taken to mean that there is at present no definite evidence that the presence of atabrine increases the intoxicating or toxic effects of alcohol per se, and vice versa.

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Naval Medical Supply Depot Service: How may the medical officer help?

Medical department units ashore and afloat can lessen the interval between the date of a requisition and that of receipt of items by careful observance of the following points:

(a) By preparing S.D. requisitions in accordance with the instructions in the Supply Catalog and Appendix D, Manual of the Medical Department, Bureau Circular Letter F, dated May 26, 1941.

(b) By paying attention to the necessity of indicating the type and voltage of electric current, proper identification of parts (when required) and the identification of the unit or apparatus, serial numbers, etc. for which the parts are required.

(c) By limiting "emergency" requisitions to items and quantities required immediately to meet needs until regular or replenishment S.D. requisitions are submitted, particularly when air mail, air express, railway express

or other costly method of shipment is required.

(d) Bearing in mind transportation difficulties, congestion and delays, whenever possible units should submit S.D. requisitions well in advance of overhaul or "in port" periods.

(e) When possible, replenishment S.D. requisitions should be submitted not less than two months in advance of the time material is required, due allowance being made for transit time. If at the time the requisitions are prepared, certain items are desired at an early date, those items should be listed in a separate requisition and an appropriate comment made under "remarks."

(f) Requisitions for material such as beds, chairs, bedside lockers, mattresses, overbed tables, sterilizers, x-ray units, and similar major items required to outfit or expand shore stations should be submitted at the earliest possible date and bear a statement as to the tentative date material is desired or can be received.

(g) Dispatch or letter inquiry relative to prospective shipment of material should be limited to urgently necessary items. When such communication cannot be avoided, care should be observed to identify accurately the proper name of the ship or station, the S.D. requisition number and date, the item number, stock number, and the name of the material. (Extract from letter, U.S. Naval Medical Supply Depot, Brooklyn, N.Y.)

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War Injuries of the Head: Emergency treatment of head injuries depends upon the condition of the patient. Shock should be treated. If the patient is unconscious and there is no open wound, expectant treatment is indicated with the patient in proper position for free breathing. In open scalp wounds hemorrhage should be controlled, the scalp cleansed, sulfanilamide powder applied, and the wound covered.

No surgery should be done until after neurologic and x-ray examination of the head. Sulfanilamide is most effective for open wounds of the head since irritative symptoms, characterized by Jacksonian seizures have followed the insertion of sulfathiazole and sulfadiazine in brain wounds. Sulfadiazine is the drug of choice for oral administration. (Craig, Med. Ann. Dist. Col. Dec. '42.)

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The Principles of Treatment of Closed Head Injury: A discussion of head injuries without break in the scalp. In generalized coma, the result of trauma, the author recommends surgical exploration only if the coma deepens or signs of hemiplegia become more marked. Otherwise, the patient should be treated by "intelligent neglect" with maintenance of nutrition, while on the watch for changes. In cases of respiratory embarrassment, morphine is contraindicated and chloral-bromide or paraldehyde is used. However, the author has seen no ill effects from small to moderate doses of morphine to control restlessness in cases of scalp wounds and unconsciousness no deeper than stupor. (Brown, Bull. N.Y. Acad. Med. Jan. '43.)

NOTE: The incidence of wounds of the head arriving at hospitals from the combat zones has been lower than expected. The same is true of wounds of the abdomen.

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Conservation of Rubber Gloves by Chemical Sterilization: The author describes a technique of sterilizing rubber gloves by chemicals which extends their lives 900% over boiled gloves and still more over autoclaved gloves.

With the shortage of rubber and the problem of transport such a method should be of particular value wherever supplies and equipment may be short.

The method, according to the author, assures complete sterility.

(1) Each pair of gloves is washed with soap and running water for one minute.
(2) They are then wholly immersed (no air bubbles) in mercuric chloride 1:1000 aq. solu. for 10 minutes.
(3) Full immersion in 70% alcohol for one minute completes the preparation.

After operations upon infected cases, gloves are immersed for ten minutes in the mercuric chloride solution before being put away. After operations upon gas infections, tetanus or anthrax cases, the gloves are soaked in mercuric chloride for one hour on three successive days. (Taylor, U.S.N. Med. Bull. Oct. '42.)

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Bureau of Medicine and Surgery Form Letters reprinted in this issue from Navy Department Semimonthly Bulletin:

1. Subject: Addition to the DIAGNOSTIC NOMENCLATURE of the Medical Department of the United States Navy. (March 15, '43.)

2. Subject: IMMUNIZATION OF ALL PERSONNEL AGAINST TETANUS, by the Use of Alum Precipitated (Insoluble) Tetanus Toxoid. (April 1, '43.)

Tourniquet - Danger of Prolonged Application: Research by Drs. George W. Duncan and Alfred Blalock from the Department of Surgery of Johns Hopkins University School of Medicine and Hospital proved that the prolonged application of a tourniquet to an injured extremity greatly reduced the chances of survival of the animal. In the experiments large animals were used under anesthesia. Trauma was produced by artificial means. Ten animals served as controls, no tourniquet being applied. In the remaining ten animals a rubber tourniquet was applied tightly around the upper part of the thigh. The tourniquet was left in place five hours. Death occurred in all experimental animals on which the tourniquet was applied to the injured extremity, whereas eight of the control animals survived. (Surg. Mar. '43.)

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The tourniquet, though it may be life saving, also may be, when not wisely used, death dealing. The above paragraph highlights the importance of periodic release of tourniquet pressure to save the life as well as the injured limb.

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German Reports on Trichiniasis: H. Spaeth points out that trichiniasis has been rare in pigs in Germany and almost unknown in man but that it is common in Poland, Russia and Norway and that the condition is occurring frequently in German troops in these countries, especially when the advance of troops renders proper inspection of meat difficult. The cardinal symptoms usually seen include conjunctivitis with edema of the eyelids, disappearing in two to four days, fever, muscle pains and eosinophilia. Only two patients of all those on whom electrocardiographic studies were made showed a normal electrocardiogram. The electrocardiogram became stable about the twelfth week. Mortality is related less to the number of encapsulated larvae than to the patient's age and the condition of the circulation. There was one death. Convalescence, as the electrocardiogram shows, should last much longer than was formerly thought necessary. For treatment castor oil was used in the early stages in an attempt to expel the adult worms. All pork, the author says, should be cooked for two and one-half hours in pieces not thicker than 10 cm. (Deut. Med. Woch. Sept. 11, '42.)

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Bacterial Endocarditis Unaffected by Sulfa Drugs: Galbreath and Hull from Louisiana State University School of Medicine report the results of treating 67 cases of bacterial endocarditis during the years 1938-1941. All of the patients died. In some there were temporary remissions in the temperature curve, but for the most part the disease pursued a course apparently unaffected by the treatment. One or more of the sulfonamide drugs was used in the treatment of 42 cases. The sulfonamides were not used in 25 cases. (Annals Int. Med., Feb. '43.)

From: The Chief of the Bureau of Medicine and Surgery. P2-3/EN (054-40)
To: All Ships and Stations. Y: mlm
March 4, 1943

Subject: IMMUNIZATION OF ALL PERSONNEL AGAINST TETANUS, By The Use of Alum Precipitated (Insoluble) Tetanus Toxoid.

Reference: (a) BuM&S Form Letter No. 7, P2-3/EN (054), dated August 5, 1941.

1. Reference (a) is herewith canceled and superseded.

2. All personnel of the U.S. Navy and U.S. Marine Corps on active duty (regular, reserve, and retired), regardless of age, shall be immunized against tetanus, using alum precipitated (insoluble) tetanus toxoid.

3. The INITIAL IMMUNIZATION shall consist of two injections, 0.5 (½) cc. each of alum precipitated tetanus toxoid, given intramuscularly with an interval of not less than 4 or not more than 8 weeks.

4. ROUTINE "BOOSTER" (OR STIMULATING) IMMUNIZATION. One year after the completion of initial immunization, each individual shall be given a single "booster" (or stimulating) injection of 0.5 (½) cc. of alum precipitated tetanus toxoid intramuscularly and thereafter every four (4) years in the absence of recorded emergency booster injections. When possible, in addition to the provisions of pars. 2 and 3 above, all personnel shall receive a "booster" injection of 0.5 (½) cc. of alum precipitated tetanus toxoid before going into a combat zone, irrespective of time interval since previous injection. When practicable, this should be given approximately 1 month before entering the combat zone.

5. EMERGENCY "BOOSTER" INJECTIONS. In addition to the initial and routine "booster" injections, emergency "booster" immunization, consisting of 0.5 (½) cc. of alum precipitated tetanus toxoid given intramuscularly, shall be administered immediately to the following:

a. Each individual who incurs a wound or severe burn in battle.

b. Patients undergoing secondary operations or open manipulations, when, in the opinion of the responsible medical officer, there exists the possibility of contamination with tetanus spores or organisms.

c. Individuals who incur punctured or lacerated nonbattle wounds, powder burns, or other conditions which might be complicated by the introduction of tetanus spores or bacilli.

6. PRECAUTIONS. Extreme care should be exercised: (a) To assure that the injections are given deeply intramuscularly; (b) to avoid injecting tetanus toxoid directly into the blood stream as a result of puncturing small blood vessels. A preferable site of injection is in the deltoid

muscle, approximately half the distance from the point of the shoulder to the insertion of this muscle.

7. All reactions following the administration of tetanus toxoid shall be recorded and reported in accordance with the instructions contained in par. 2606, Manual of the Medical Department, U.S. Navy, covering reactions to typhoid vaccination. It is to be expected that some degree of muscle soreness and swelling will result in most instances. Unless this is unusually severe, it is not considered necessary to report this as a reaction.

8. TETANUS ANTITOXIN shall be used only for the treatment of clinical tetanus and for the prevention of tetanus in wounded individuals who have not previously been actively immunized with tetanus toxoid. Patients given tetanus antitoxin prophylactically shall be immunized at the same time with tetanus toxoid as directed in pars. 3 and 4 above.

9. When the second dose of the initial immunization of tetanus toxoid has been given, the identification tag shall be die-stamped with the capital letter T, followed by the number of the month and the last two digits of the year, e.g. (T2-43). "Booster" injections shall be entered on the Vaccination Record sheet in the Health Record in the space under "Other Inoculations" and signed by the medical officer.

10. The tetanus toxoid will be supplied in containers of amber glass in 2 sizes, 10 cc. and 50 cc. Each activity requiring tetanus toxoid is directed to submit an NMS Form 4 requisition (dispatch for stations and ships outside continental limits) to the nearest naval medical supply depot or naval medical supply storehouse.

11. Immunization of individuals who are incapacitated because of acute illness, or severe injury unassociated with danger of tetanus, may be deferred at the discretion of the medical officer until such time as may be considered safe or not interfering with the progress or convalescence of the individual.

12. There is no contra-indication to administering the first injection of alum precipitated tetanus toxoid concurrently with triple typhoid vaccine or smallpox vaccine.

13. In summation, immunization against tetanus, using alum precipitated tetanus toxoid, shall be administered as follows:

a. INITIAL IMMUNIZATION. Two intramuscular injections of 0.5 ($\frac{1}{2}$) cc. each given not less than 4 or more than 8 weeks apart.

b. ROUTINE "BOOSTER" IMMUNIZATION.

(1) All personnel shall receive 0.5 ($\frac{1}{2}$) cc. intramuscularly, 1 year after completing the initial immunization and every four (4) years thereafter.

(2) When practicable, 1 month before entering a combat zone, all personnel will receive 0.5 ($\frac{1}{2}$) cc. intramuscularly, irrespective of time interval since previous injection with alum precipitated tetanus toxoid.

c. EMERGENCY "BOOSTER" IMMUNIZATION. All personnel sustaining burns or wounds in battle, or who incur non-battle puncture wounds or burns in which there is danger of contamination with tetanus spores or bacilli, shall be given an emergency injection of 0.5 ($\frac{1}{2}$) cc. of tetanus toxoid injected intramuscularly, providing that they have received initial immunization.

14. It is obvious that in combat areas where health records and even identification tags are often not available, absolute reliance must be placed upon the basic tetanus immunization of all personnel (pars. 3 and 4). Booster injections as outlined in paragraph 5 are without value for immediate protection unless basic immunization has been previously given. Unvarying and rigid compliance with this directive is therefore enjoined.

ROSS T. McINTIRE.

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From: The Chief of the Bureau of Medicine and Surgery.
To: All Ships and Stations.

A10-3/EN 10 (023)
R:JLA
February 26, 1943

Subject: Addition to the DIAGNOSTIC NOMENCLATURE of the Medical Department of the United States Navy.

1. The following diagnoses have been added to the Diagnostic Nomenclature of the Navy to facilitate accurate recording of neuropsychiatric disorders and a symptom complex which is brought about by war conditions.

Diagnosis number	Title
1542	Constitutional psychopathic state, schizoid personality.
1543	Psychoneurosis, mixed type.
1544	Psychosis with psychopathic personality.
1545	Simple adult maladjustment.
2170	Fatigue; state type, e.g., combat or operational.

2. Constitutional psychopathic state, schizoid personality is intended for patients in whom there is evidence and history of constitutional psychopathic traits without definite psychosis but with a schizoid coloring. The history should indicate that these traits have existed for a number of years prior to enlistment but there should be no findings which would justify a diagnosis of Dementia Praecox at the time of his separation from the service.

3. Psychoneurosis, mixed type, is intended for the group of patients in whom the history and findings show mixed psychoneurotic manifestations without predomination of any one special type and in whom definite classification in any one type would be inaccurate.

4. Psychosis with psychopathic personality is intended for patients with a history of long standing psychopathic personality on which a definite psychosis has developed.

5. Simple adult maladjustment is intended for patients who have apparently adjusted well to their surroundings in early life but who manifest behavior disorders or other evidences of failure to adjust to the responsibilities and requirements of adult life.

6. Fatigue; state type, e.g., combat or operational, is intended for patients who under the stress and strain of combat conditions or the harassing conditions of patrol or other operational activities develop a symptom complex of physical and mental fatigue necessitating their admission to the sick list. "Combat" should be used in cases in which the symptom complex has been precipitated by definite combat conditions and "operational" when it has arisen under Naval war time operating conditions in which the individual has not been exposed to combat. This symptom complex is usually characterized by anxiety, insomnia, irritability, tremors, loss of appetite, and exaggerated fears.

7. It is the desire of the Bureau that diagnoses appearing in Class 15 of the Diagnostic Nomenclature of the Navy be established only after adequate periods of observation and under circumstances affording facilities for complete study of the case. A definite diagnosis of a neuropsychiatric disease or condition in the health record of an officer or a man often has an adverse effect upon his future career and as a rule a positive diagnosis should not be entered until the individual has had the benefit of study in a hospital. Under circumstances not affording adequate time or facilities for observation patients in whose cases a neuropsychiatric disorder is apparent should be admitted under "Diagnosis Undetermined," with an appropriate term in parentheses, and so carried until the case can be studied in a hospital.

ROSS T. McINTIRE.